Stoller
Hanford Office

DOE-EM/GJ971-2005

C4947
Log Data Report

Borehole Information:

Borehole: C4947			Site: 100 B/C Area		
Coordinates (WA St Plane)		GWL[1] (ft): 84		GWL Date: 08/18/05	
North (m)	East (m)	Drill Date	Ground Level Elevation (ft)	Total Depth (ft)	Type
Not available	Not available	08/05	Not available	96	Cable

Casing Information:

Casing Type	Stickup (ft)	Outer Diameter (in.)	Inside Diameter (in.)	Thickness (in.)	Top (ft)	Bottom (ft)
Welded Steel	None	11	10	1/2	See notes	93

Borehole Notes:

Casing diameter and casing stickup measurements were acquired by the logging engineer using a caliper and steel tape. Measurements were rounded to the nearest 1/16 in.

This borehole was drilled at the bottom of an approximate 15-ft deep excavation. The log data are adjusted to a common reference depth, which is the static water level. The water level is reported in a Well Construction Summary Report at 84 ft, and the logging engineer measured water level at 68.5 ft. Therefore, all log data were adjusted 15.5 ft downward to coincide with the Well Construction Summary Report depths. All depths in this report have been adjusted and consequently do not coincide with original data files or field information.

The borehole was apparently drilled to a total depth of 96 ft with casing extending to 93.5 ft. The logging engineer started logging at 93 ft and the sonde did not enter into the open hole portion of the borehole.

Logging Equipment Information:

Logging System:	Gamma 4E		Type:	SGLS (70%) SN: 34TP40587A
Effective Calibration Date:	12/21/04	Calibration Reference:	DOE/EM-GJ854-2005	
		Logging Procedure:	MAC-HGLP 1.6.5, Rev. 0	

Logging System:	Gamma 4M		Type:	NMLS SN: H340207279
Effective Calibration Date:	03/24/05	Calibration Reference:	DOE/EM-GJ856-2005	
		Logging Procedure:	MAC-HGLP 1.6.5, Rev. 0	

Spectral Gamma Logging System (SGLS) Log Run Information:

Log Run	1	2 Repeat			
Date	08/18/05	08/18/05			
Logging Engineer	Spatz	Spatz			
Start Depth (ft)	93.0	36.0			
Finish Depth (ft)	16.0	28.0			
Count Time (sec)	100	100			
Live/Real	R	R			
Shield (Y/N)	N	N			
MSA Interval (ft)	1.0	1.0			
ft/min	N/A[2]	N/A			
Pre-Verification	DE861CAB	DE861CAB			
Start File	DE861000	DE861078			
Finish File	DE861077	DE861086			
Post-Verification	DE861CAA	DE861CAA			
Depth Return Error (in.)	+ 1	0			
Comments	Fine gain adjustments after files -021 and -077.	No fine gain adjustment.			

Neutron Moisture Logging System (NMLS) Log Run Information:

Log Run	3	4 Repeat			
Date	08/19/05	08/19/05			
Logging Engineer	Spatz	Spatz			
Start Depth (ft)	83.0	36.0			
Finish Depth (ft)	15.75	28.0			
Count Time (sec)	N/A	N/A			
Live/Real	R	R			
Shield (Y/N)	N	N			
Sample Interval (ft)	0.25	0.25			
ft/min	1.0	1.0			
Pre-Verification	DM022CAB	DM022CAB			
Start File	DM022000	DM022270			
Finish File	DM022269	DM022302			
Post-Verification	DM022CAA	DM022CAA			
Depth Return Error (in.)	- 1	0			
Comments	None	None			

Logging Operation Notes:

Logging was conducted with centralizers on the sondes. Repeat sections were collected in this borehole to evaluate system performance.

Analysis Notes:

Analyst:	Henwood	Date:	09/15/05	Reference:	GJO-HGLP 1.6.3, Rev. 0

Pre-run and post-run verifications for the logging systems were performed before and after the day's data acquisition. The acceptance criteria were met.

A casing correction for 0.5-in.-thick casing was applied to the SGLS log data. There is no valid calibration for the neutron moisture data in a 10-in. borehole. Therefore, the data are plotted in counts per second (cps) and no correction factors are applied.

SGLS spectra were processed in batch mode using APTEC SUPERVISOR to identify individual energy peaks and determine count rates. Concentrations were calculated with an EXCEL worksheet template identified as G4EApr05.xls using efficiency functions and corrections for casing, water, and dead time as determined from annual calibrations. No corrections for dead time were necessary. A correction for water inside the casing is applied to the data below 84 ft.

Log Plot Notes:

Separate log plots are provided for the man-made radionuclide (^{137}Cs) detected in the borehole, naturally occurring radionuclides (^{40}K, ^{238}U, ^{232}Th [KUT]), a combination of man-made, KUT, total gamma and moisture, total gamma plotted with dead time, and moisture. For each radionuclide, the energy value of the spectral peak used for quantification is indicated. Unless otherwise noted, all radionuclides are plotted in picocuries per gram (pCi/g). The open circles indicate the minimum detectable level (MDL) for each radionuclide. Error bars on each plot represent error associated with counting statistics only and do not include errors associated with the inverse efficiency function, dead time correction, casing corrections, or water corrections. Repeat section plots are provided where appropriate.

Results and Interpretations:

^{137}Cs was the only man-made radionuclide detected in this borehole. ^{137}Cs was detected using the routine processing software at 29 and 33 ft near the MDL of 0.2 pCi/g. However, further scrutiny of the energy peaks indicates the detections are a result of statistical fluctuations and are not valid. .

The moisture log data can be used qualitatively to determine relative moisture content.

The repeat sections generally indicate good agreement of the naturally occurring KUT and moisture.

[1] GWL – groundwater level

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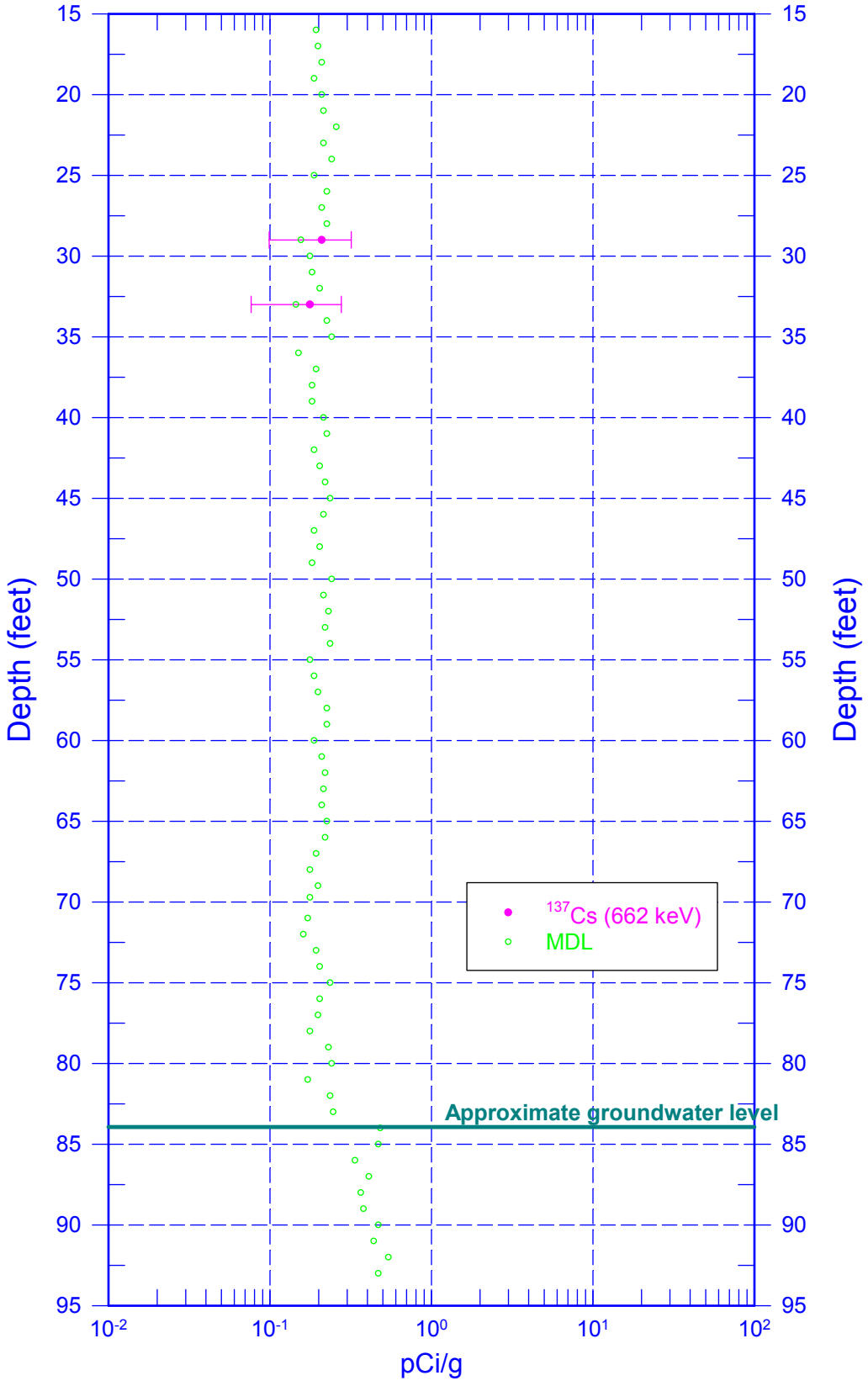
Man-Made Radionuclides



Zero Reference - ground surface

Depth scale: 1" = 10 ft

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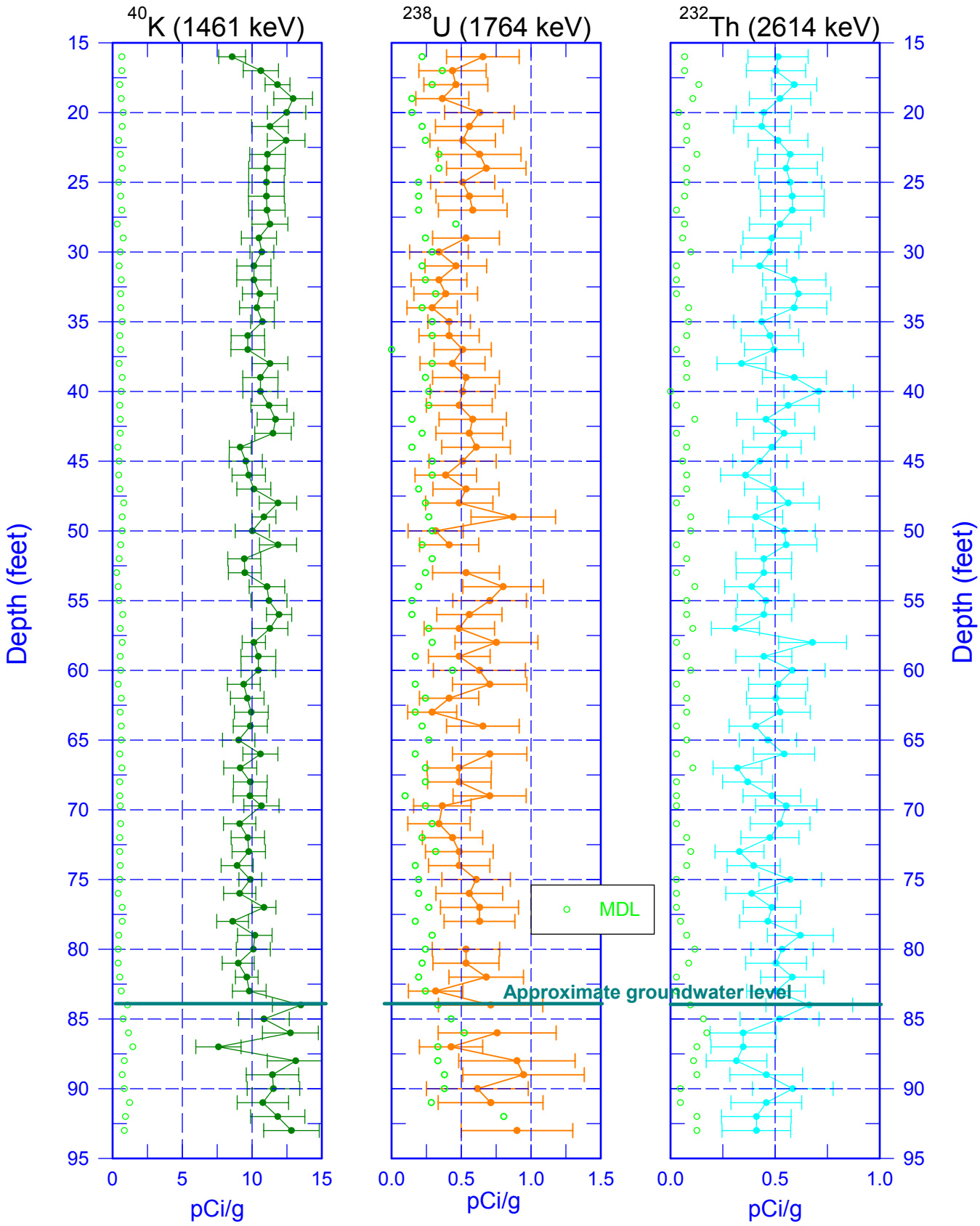
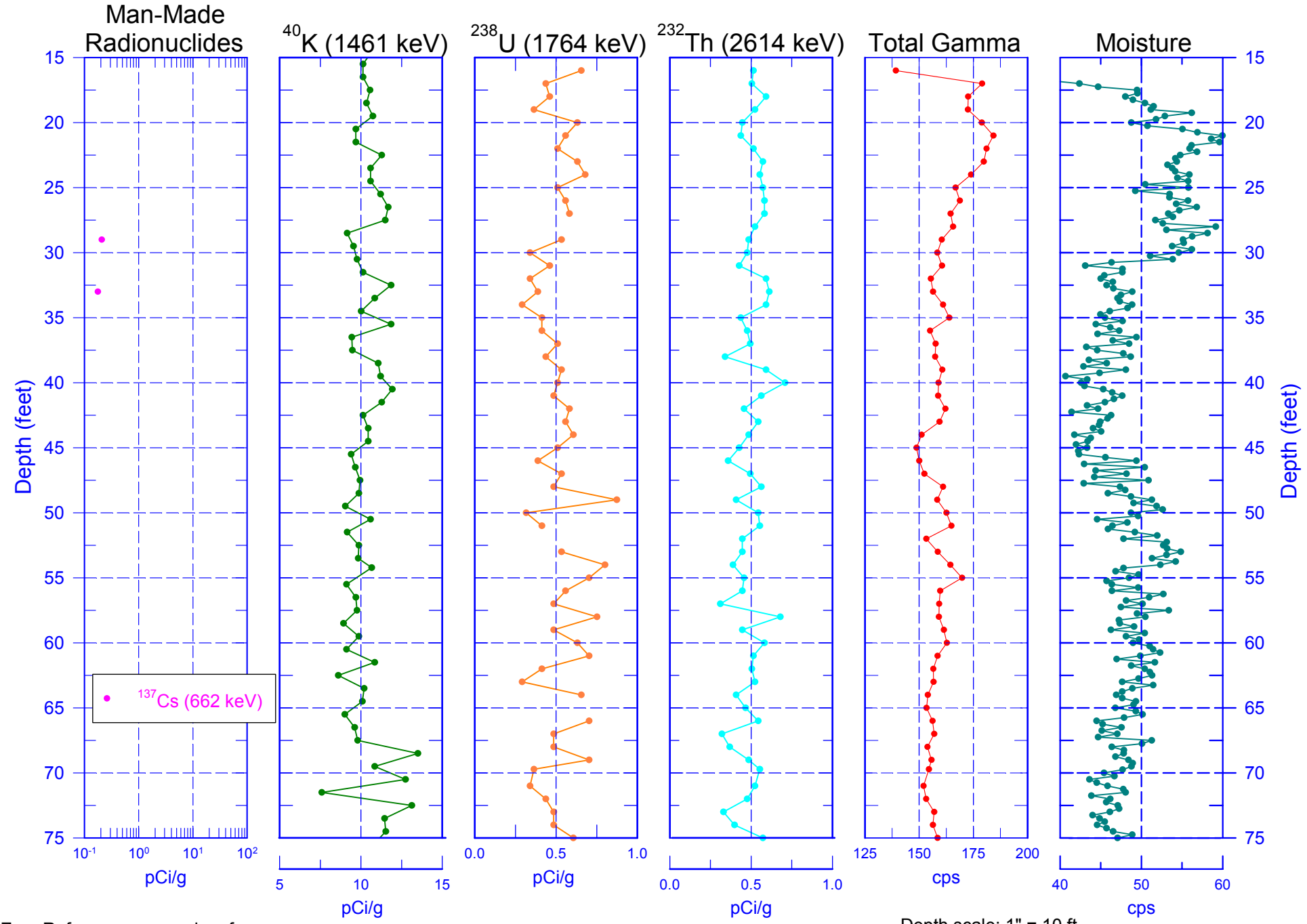
Natural Gamma Logs



Zero Reference = ground surface

Depth scale: 1" = 10 ft

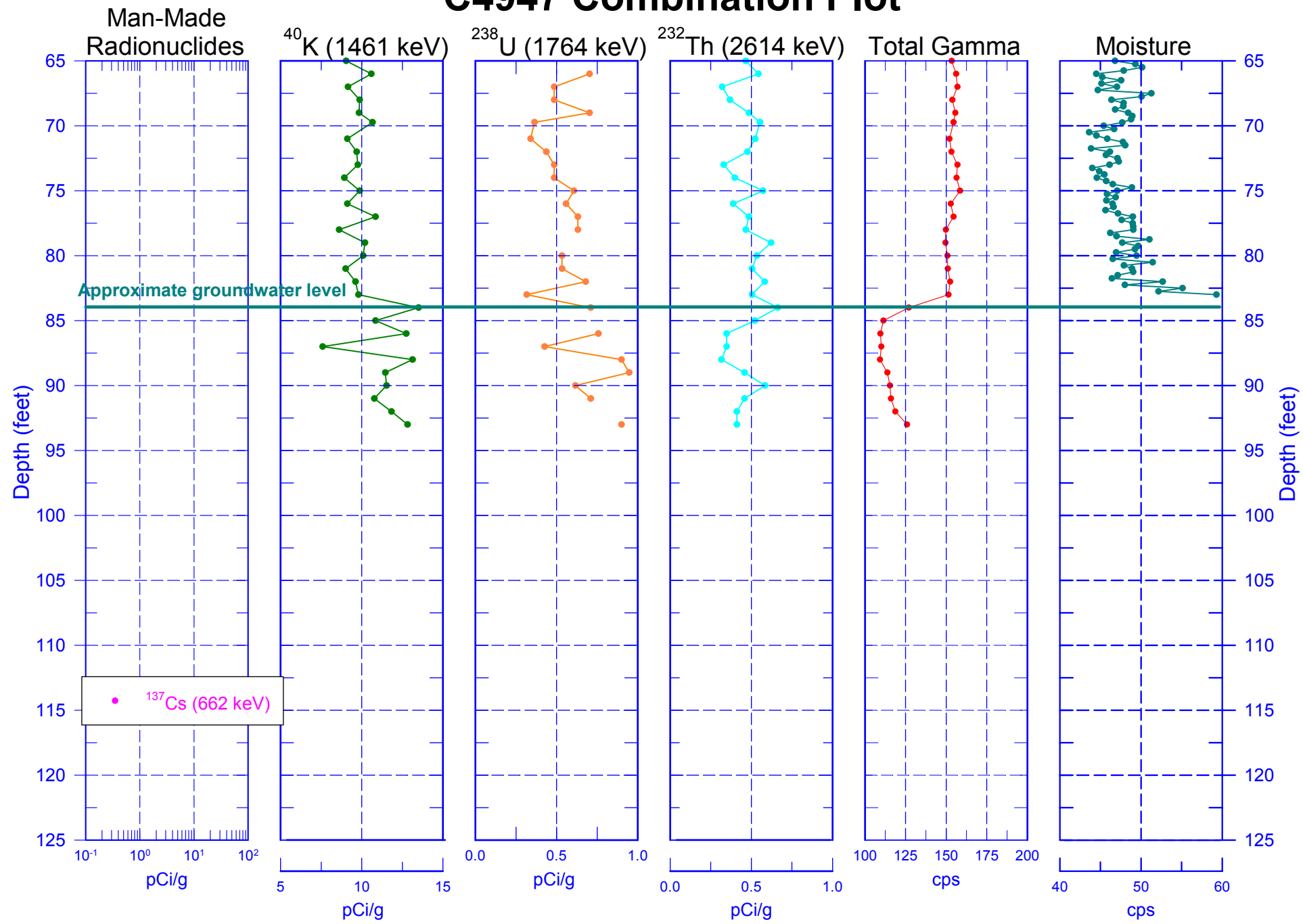
C4947 Combination Plot



Zero Reference - ground surface

Depth scale: 1" = 10 ft

C4947 Combination Plot



Zero Reference - ground surface

Depth scale: 1" = 10 ft

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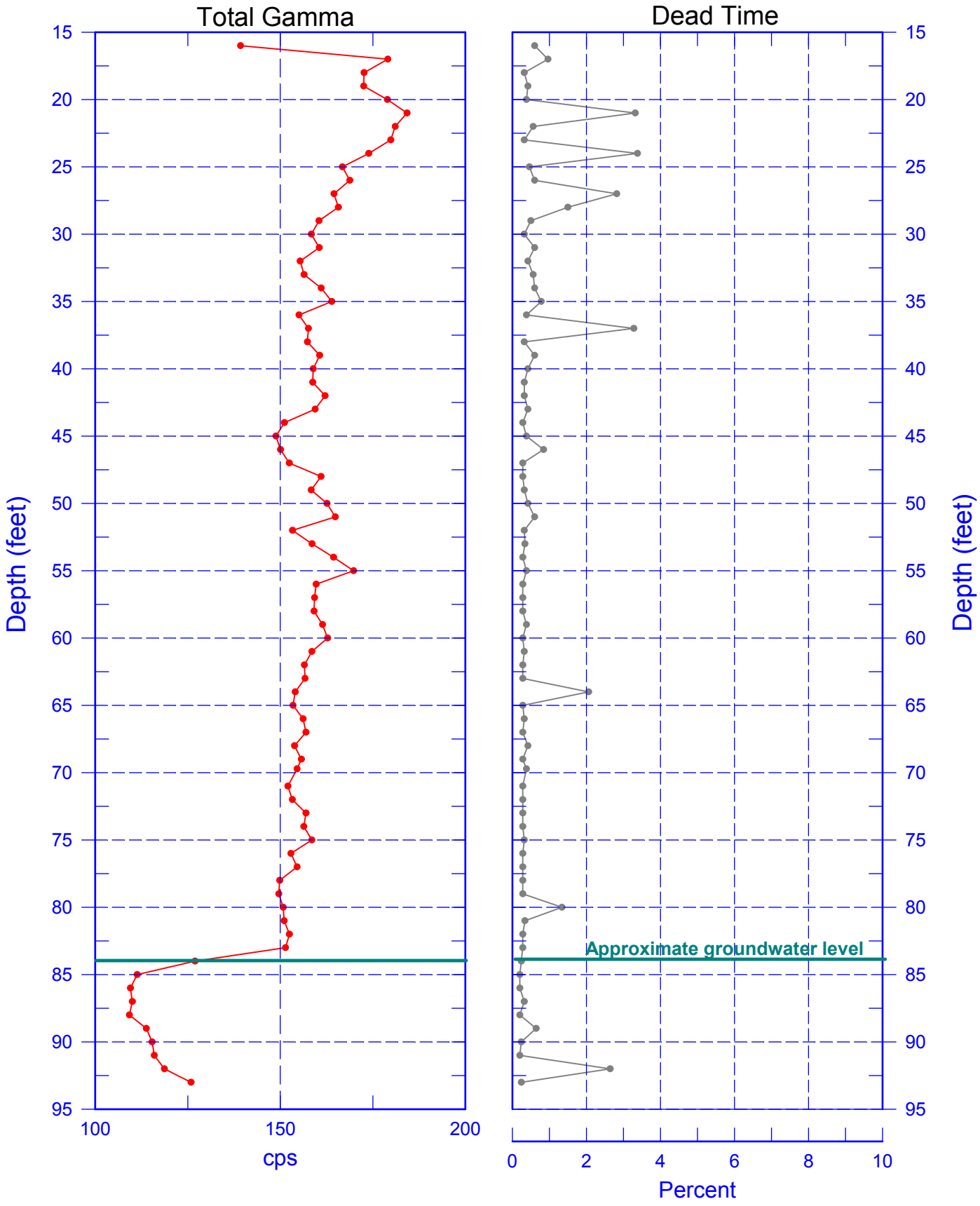
Total Gamma & Dead Time



Reference - ground surface

Depth scale: 1" = 10 ft

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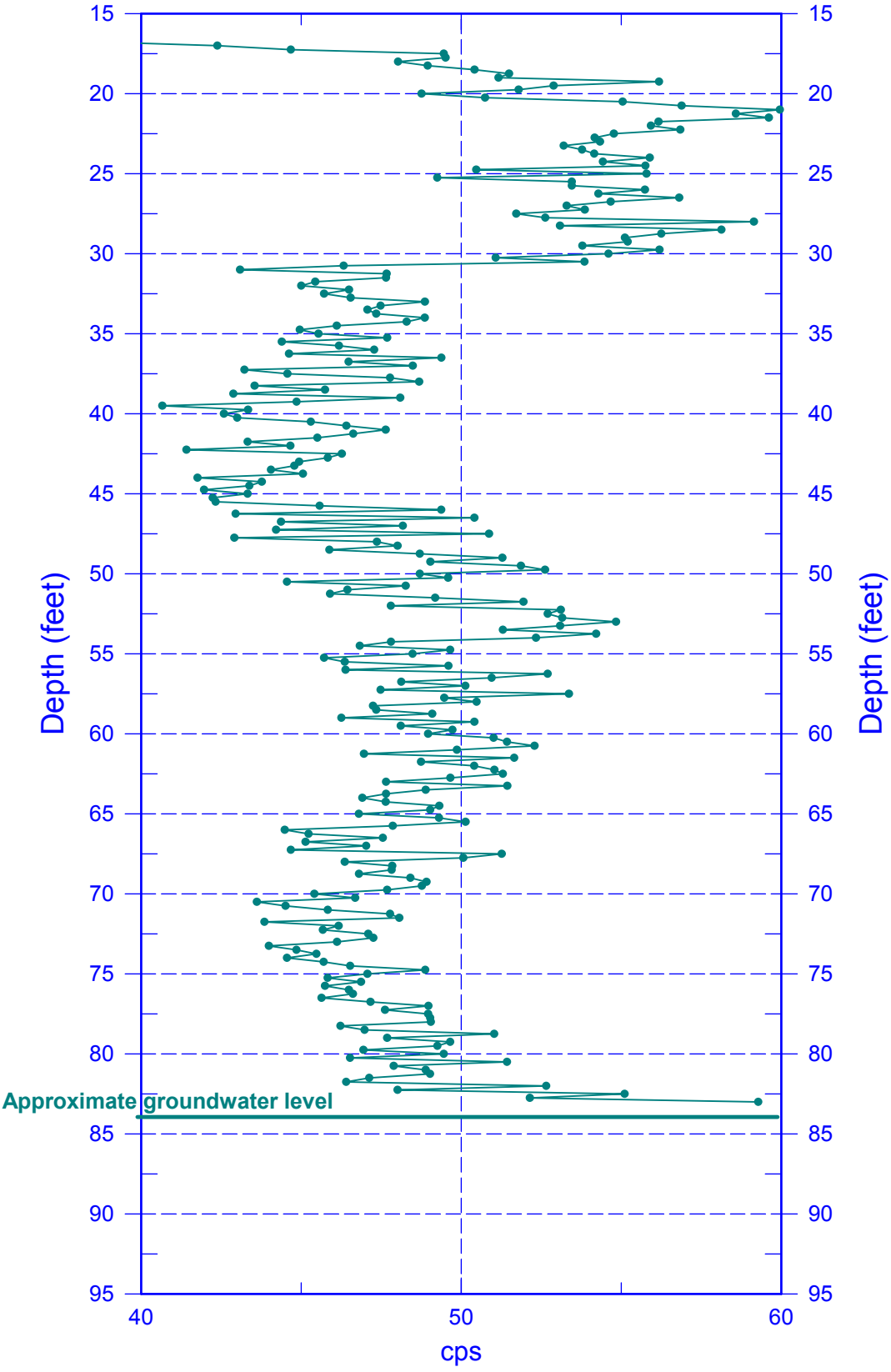
Moisture



Zero Reference - ground surface

Depth scale: 1" = 10 ft

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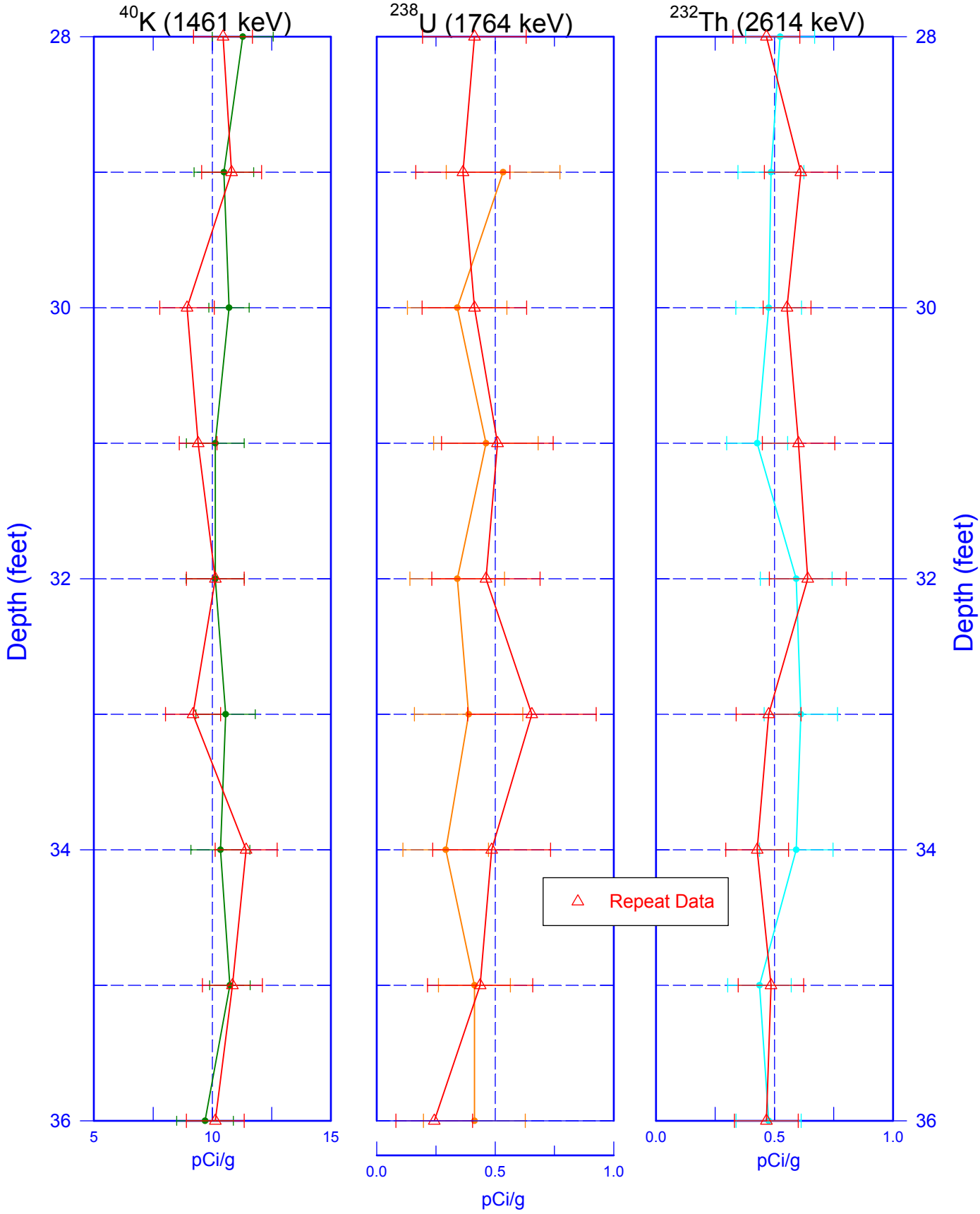
Repeat Section of Natural Gamma Logs



Zero Reference - ground surface

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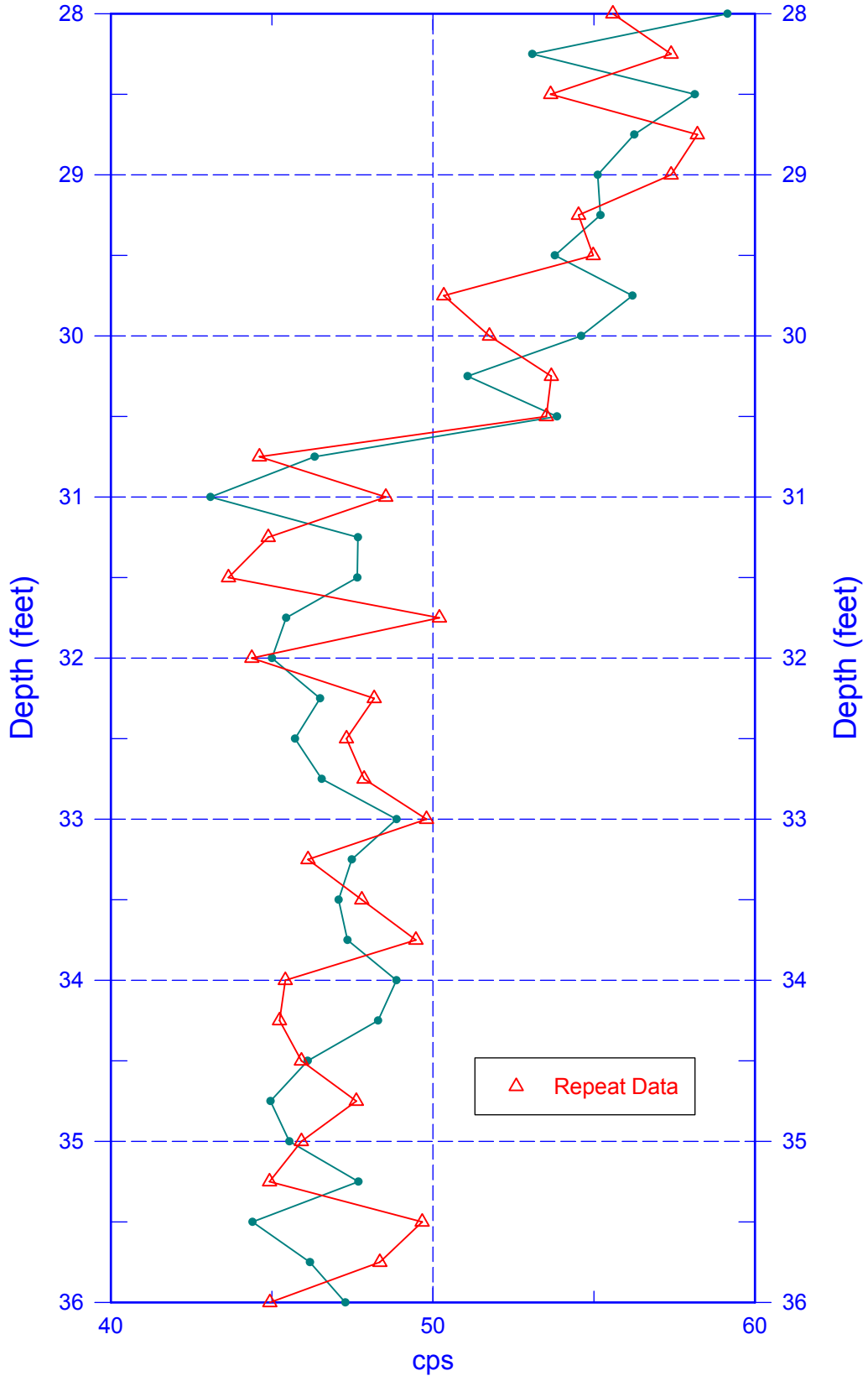
Moisture Repeat Section



Zero Reference - ground surface

Depth scale: 1" = 10 ft